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Book Reviews

Methods in Enzymology, Volumes 200 and 201: Protein Phosphorylation parts A and B; Edited by T. Hunter and B.M. Sefton; Academic Press; San Diego, 1991; Volume 200: xxxiv + 763 pages. $95.00; Volume 201: xxxii + 547 pages. $69.00.

Protein phosphorylation impinges on almost every aspect of cell and molecular biology, from the regulation of metabolically important enzymes to the control of transcription and the passage of cells through the division cycle. Thus detailed knowledge of protein kinases and phosphatases and their regulation is crucial to our understanding of the actions of hormones, the responses of cells to growth factors and cytokines, and the control of cell proliferation and differentiation.

The number of different vertebrate protein kinases now known is already well over 100, and their rate of discovery shows no sign of diminishing. Around half of these enzymes are tyrosine-specific kinases, including several important growth factor receptors and products of oncogenes. Amongst the serine/threonine-specific kinases the cyclic AMP-dependent and protein kinase C families have been extensively studied, but the cdc-2 family of cell cycle-regulatory enzymes is coming up fast on the outside as challengers for the title of kinases of the decade. Given this plethora of enzymes and cellular functions which they control the publication of these two volumes of Methods in Enzymology is therefore very welcome.

Volume 200 is devoted to aspects of the kinases themselves – their classification, purification and assay, preparation of antibodies against the enzymes, and the cloning and expression of their genes. For anyone confused by the vast array of protein kinases and their nomenclature the first chapter, by Tony Hunter, is a tour de force of useful information, consisting largely of an 18 page Table backed up by 367 references. Other chapters bring together equally useful databases of sequence information on the kinases and their substrate phosphorylation sites. Elsewhere there is the usual type of information that we have come to expect from this series, with a wealth of detail on experimental conditions and protocols, some inevitably more useful than others.

Volume 201 concentrates on methods of analysis of phosphorylated protein substrates, such as phosphopeptide mapping and phosphoamino acid determination. It also contains information about various protein kinase inhibitors, and ends with a section on those equally important enzymes, the protein phosphatases.

Methods in Enzymology has been around as a series for a long time and its format is now looking decidedly old-fashioned. There are also some gaps in the coverage provided by Volumes 200 and 201 – nothing on the widely studied interferon-inducible kinase DAI, for example, and too little about the cdc2 family. Nevertheless, these books contain a huge amount of information that will be of value to the thousands of laboratories studying protein phosphorylation world-wide. At the current rate of discovery of protein kinases (approximately one per month) it will not be long before another volume will be required.

Michael Clemens

Modern Microbial Genetics, Edited by U.N. Streips and R.E. Yasbin; Wiley-Liss; New York, 1991; xiv + 533 pages; $59.95.

Nostalgia for Hayes' classic book 'Genetics of Bacteria and their Viruses' is tinged with the realisation that such a book could never be written again. Cloning and the huge amount of information it has generated have decreed a different style. The editors of the book under review have 'opted' for a multiauthor approach 'to provide depth and enrich perspective'. It certainly is unlikely that a single author could have written this book; it is a collection of 21 articles (chapters if you like) commissioned from leading research workers arranged in a loosely connected order with editorial cross-referencing providing links within the book. *E. coli* and *B. subtilis* are the dominating Gram-negative and Gram-positive organisms although others are mentioned. The articles, which vary in length and detail, provide historical background and information up to 1989 giving experimental bases and copious references. Care has been taken to achieve clarity of exposition; the teaching skills and enthusiasm of the authors are evident. In some cases coverage seems to have been influenced by the constraints of space or authors' special interests. A chapter on Regulation of gene expression focusses on sigma factors and treatment of individual operons is highly compressed. Major regulatory networks: DNA repair, sporulation and heat shock are covered separately. DNA replication, transformation, transduction, conjugation, recombination, restriction enzymes and a ruminative article on the physiology of DNA segregation and cell division, follow. T4 serves as a model phage although some *B. subtilis* phages are also included; a separate chapter is devoted to single-stranded DNA phages. There is a long and absorbing article on transposons and transcription. Cloning is

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well-described from a strategic point of view. *Agrobacterium* is treated in depth and eucaryotic microorganisms are represented by *Aspergillus nidulanus* and by *S. cerevisiae* for which chromosomal metabolism is used as a peg on which to hang genetics and justify yeast as a model eucaryotic organism. Addenda provide a useful means of including topics not easily integrated within articles; these include 'tricks of the trade' applied to yeast genetics and fungal fermentation.

The wealth of information is reflected in the excellent 18 page index but has also resulted in a type format that, at ca. 900 words per page induced eye-strain in this reader. Illustrations are plain and clear although not always profuse enough. A knowledge of basic microbial genetics and elementary molecular biology is assumed. Despite the rather short-sighted title, if you are interested in or teach Microbial Genetics, this will be a useful and convenient book.

P.R. Brown

Genetically-Engineered Proteins and Enzymes From Yeast: Production Control; Edited by A. Wiseman; Ellis Horwood; New York, 1991; 203 pages, £35.00.

The stated aim of this book is to provide information from several sources on the techniques and procedures currently used in the transfer of mammalian, particularly human, genes into yeast cells and the factors regulating the expression of these genes. This objective is certainly achieved but the book provides rather more than the essentials for genetic engineering. The opening chapter presents a concise but comprehensive account of the basic principles of yeast genetics including the contruction of genetic maps from linkage data, tetrad and random spore analysis, recombination by protoplast fusion, the development of industrial strains and a lucid account of the mitochondrial genetic system. In a book on biotechnology this is unexpected but a most welcome inclusion particularly for biochemical engineers.

A second chapter describes how to make yeast vectors and the transformation procedures and gives a graphic description of the mechanism of integration of heterlogous DNA into host chromosomes. This is followed by an extensive treatise on the intricacies and pitfalls in the computer control of fermentation in which the timing of the induction of enzymes seems to be all important for the successful harvesting of relevant proteins.

A final chapter deals with the molecular biology of gene expression with special attention to a variety of promoter elements in the induction of heterologous proteins. Apart from standard inducing agencies such as catabolite derepression and manipulation of cyclic AMP levels, heat shock promoters are given a special mention being the main field of investigation of the authors (Piper and Kirk). Transcription initiation sequences, particularly the ADH2 promoter region, are described in detail from their incorporation into vectors to their function in transformation.

The book has a well-filled index.

Although publications are becoming quite numerous describing and extolling the virtues of the eukaryotic yeast cell, both *Saccharomyces* and *Schizosaccharomyces*, as the ideal system for the expression of human genes, this handy-sized book is a welcome addition to the literature providing much of the essential information for genetic manipulation. It would be a useful acquisition for those with commercial interests and for reference in the laboratories of academics working in the field.

D. Wilkie

Essential Molecular Biology: A Practical Approach, Volume II; Edited by T.A. Brown; IRL Press at Oxford University Press; Oxford, 1991; xx + 296 pages. £22.50

This is the second helping of *Essential Molecular Biology* from the excellent *Practical Approach* series. In common with *Essential Molecular Biology Volume I*, it is written for those beginning work in the field of Molecular Biology and the methodology is presented in a form that is easy to follow; however, the book should also be of interest to the more established molecular biologists. The ten chapters of the book are written by different authors (including the editor) and cover different aspects of gene cloning and analysis as well as gene expression. Following a general first chapter on gene cloning and analysis, chapters 2 and 3 deal with the construction of genomic and cDNA libraries in cosmids and bacteriaphage λ. Chapters 4 and 5 discuss the radioactive and non-radioactive labelling of nucleic acid probes, the immobilization of nucleic acids to different types of solid support and their use in hybridization experiments. The next chapter presents methods for DNA sequencing and includes useful sections on analysis of data and problem solving. Chapter 7 is a brief introduction to the polymerase chain reaction (PCR) which is very adequate for the beginner but for the more experienced molecular biologist another book in the same series entitled *PCR: A Practical Approach* (Eds. M.J. McPherson, P. Quirke and G.R. Taylor) would be a better investment. The next chapter presents various methods employed for the analysis of DNA–Protein interactions. Chapter 9 deals with the sequencing of RNA whilst chapter 10 describes methodology for the mapping of transcribed sequences. Appendices 1 and 2 give details of the widely used strains of *Escherichia coli* and a collection of media recipes and general procedures. Appendix 3 contains a series of computer-generated figures showing the patterns seen in 1.4% agarose gels for 148 different restriction enzyme digests of each of six different